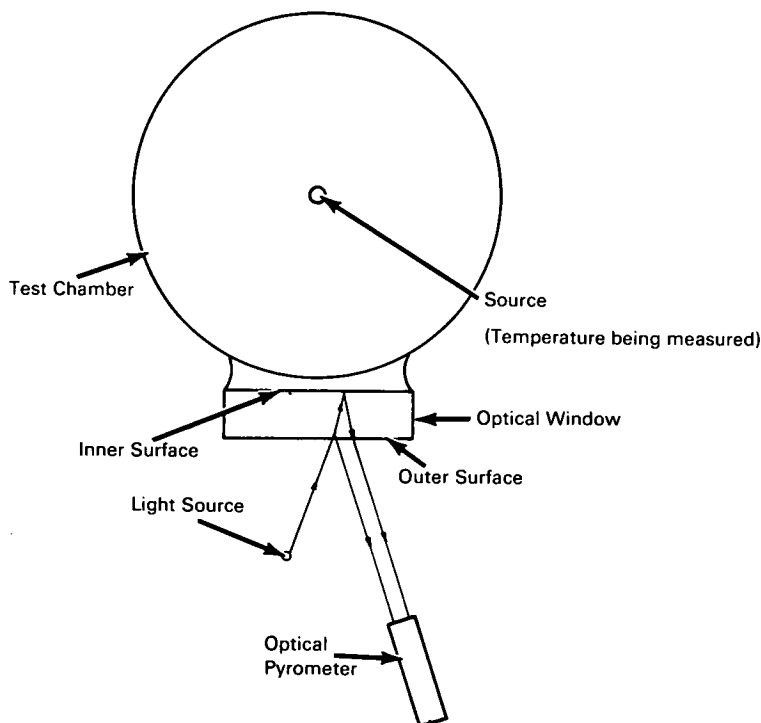


NASA TECH BRIEF



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Detection of Effect of Deposits on Optical Windows on Pyrometer Measurements



The problem:

Temperatures in an enclosed test chamber are measured through an optical window by an optical pyrometer. The transmittance characteristics of a clean window are determined by calibration. After a length of time, the inside surface of the window becomes coated with deposits as a result of the test. These coatings reduce the transmittance of the window even before the coatings are visible to the eye. Therefore, application of the original transmittance value

to measurements made under these conditions results in errors.

The solution:

The presence of deposits on the inner surface of the window can be detected by periodically measuring the reflectivity of the inner surface. An increase in the amount of light reflected from the inner surface as compared with a clean window indicates a deposit has formed.

(continued overleaf)

How it's done:

The reflectivity is measured by using an external light source and a pyrometer as indicated in the figure. The light source need not be calibrated because the outside of the window can easily be cleaned each time a measurement is made. The percentage of light reflected from the outside surface of the window therefore remains constant and can be used as a base for comparison when measuring reflections from the inside surface.

The procedure may be used to indicate when the inside of the window should be cleaned. Alternatively, corrections may be made for the temperature readings by correlating the reflectivity of the deposits with their effect on the temperature measurement. This

eliminates the need for interrupting tests to clean the inside surface of the window.

Note:

Inquiries concerning this innovation may be directed to:

Technology Utilization Officer
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Reference: B68-10367

Patent status:

No patent action is contemplated by NASA.

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